

SECTION A: 40 MARKS

Attempt all questions in this section.

Questions 1 to 20 carry two marks each.

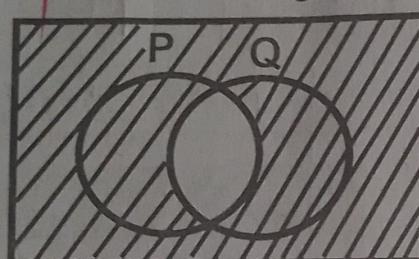
1. Complete the statement below;

$$4 + 4 + 4 = \underline{\underline{3}} \times \underline{\underline{4y}}$$

2. Simplify: $8q - 3y - 5q + 7y$

$$\begin{aligned} & 8q - 3y - 5q + 7y \\ &= 8q - 5q - 3y + 7y \\ &= \underline{\underline{3q + 4y}} \end{aligned}$$

3. Describe the shaded region on the Venn diagram below.

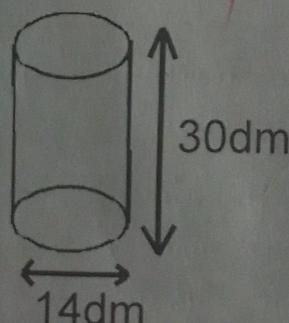


$$(P \cap Q)^c$$

4. Find the number whose standard form is 5.702×10^5 .

$$\begin{aligned} & 5.702 \times 10^5 \\ &= \frac{5702}{1000} \times 10 \times 10 \times 10 \times 10 \\ &= 5702 \times 100 \\ &= 570200 \end{aligned}$$

5. Find the volume of the cylinder below. (use $\pi = \frac{22}{7}$)



$$\begin{aligned} V &= \pi r^2 h \\ &= \frac{22}{7} \times \frac{14}{2} \times \frac{14}{2} \times \frac{7}{1} \times 30 \\ &= 11 \times 14 \text{ dm}^2 \times 30 \text{ dm} \\ &= 154 \text{ dm}^2 \times 30 \text{ dm} \\ &= 4620 \text{ dm}^3 \end{aligned}$$



6. Divide; 3612 by 6.

$$= \frac{36.12}{\$}$$

$$= \underline{\underline{602}}$$

7. Tap Q takes 3 minutes to fill the tank; tap P takes 4 minutes to draw the same tank. After how long will both taps take to fill the tank if open together at the same time?

		time taken
Tap Q = 3 min 1 min $\rightarrow \frac{1}{3}$	$\begin{array}{r} \frac{1}{3} - \frac{1}{4} \\ \hline - 4 - 3 \\ \hline 12 \\ = \frac{1}{12} \end{array}$	$(1 \div \frac{1}{12}) \text{ min}$ $= 1 \times \frac{12}{1} \text{ min}$ $= 12 \text{ minutes}$
Tap P = 4 min 1 min $\rightarrow \frac{1}{4}$		

8. Using a ruler, a pencil and a pair of compasses only, construct an angle of 105° .

9. Solve the equation: $3p + 4 = 16$.

$$\begin{aligned} 3p + 4 &= 16 \\ 3p + 4 - 4 &= 16 - 4 \\ 3p &= \frac{12}{3} \\ p &= 4 \end{aligned}$$

10. Express $\frac{5}{7}$ as a recurring decimal.

$$\frac{0.454545\ldots}{11} = \underline{50}$$

$$4 \times 11 = \frac{44}{\cancel{6}0 \cancel{4}}$$

$$5 \times 11 = \frac{55}{-50}$$

$$4 \times 11 = \underline{\underline{44}}$$

$$4 \times 11 = \frac{44}{88}$$

卷之三

$$\therefore \frac{5}{11} = 0.454545\overline{A}$$

11. Find the mean of 16 , x , $2x + 3$ and $x + 1$.

$$\begin{aligned}\text{Mean} &= \frac{\text{Sum of all items}}{\text{No. of all items}} \\ &= \frac{16 + x + 2x + 3 + x + 1}{4} \\ &= \frac{16 + 3 + 1 + x + 2x + x}{4}\end{aligned}$$

$$\begin{aligned}&= \frac{20 + 4x}{4} \\ &= 5 + x\end{aligned}$$

12. At a forex bureau, one USA dollar costs Ug. sh. $3,650$. A tourist has Ug. sh. $1,825,000$. Find how many dollars she will get.

$$\begin{aligned}&= \left(\frac{\text{Ug. sh. } 1,825,000}{\text{Ug. sh. } 3,650} \right) \text{ dollars} \\ &= \frac{500}{73} \text{ dollars} \\ &= 500 \text{ dollars}\end{aligned}$$

13. A bus arrived at 2:40pm; If the journey took $2\frac{1}{2}$ hours, at what time did it depart?

$$\begin{aligned}ST &= ET - D \\ &= 2:40 \text{ pm} \\ &\quad - 2 \text{ hrs } 30 \text{ min} \\ &= 12:10 \text{ pm}\end{aligned}$$

14. Change 1101_{two} to base ten.

$$\begin{aligned}1101_{\text{two}} &= (1 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0) \\ &= 1 \times 2 \times 2 \times 2 + 1 \times 2 \times 2 + 0 \times 2 + 1 \times 1 \\ &= 8 + 4 + 0 + 1 \\ &= 12 \\ &= 13_{\text{ten}}\end{aligned}$$

15. Calculate the square root of 1.44 .

$$\begin{aligned}1.44 &= \sqrt{144} \\ &\quad \sqrt{100} \\ &= \frac{12}{10} \\ &= 1.2\end{aligned}$$

$$\begin{array}{r} 144 \\ 2 \overline{)144} \\ 72 \\ 2 \overline{)72} \\ 36 \\ 2 \overline{)36} \\ 18 \\ 2 \overline{)18} \\ 9 \\ 3 \overline{)9} \\ 3 \\ 1 \end{array}$$

16. Set M has 64 subsets. Find n(M).

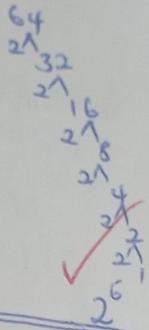
$$2^n = \text{No. of subsets}$$

$$2^n = 64$$

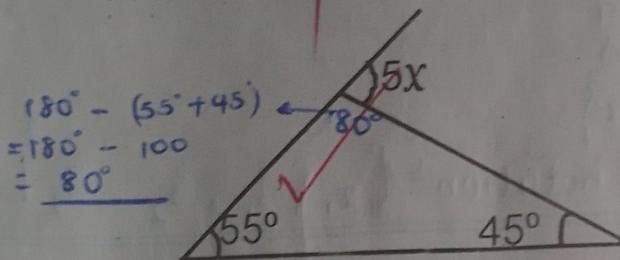
$$2^n = 2^6$$

$$n = 6$$

$$\underline{n(M) = 64}$$



17. Find the value of x in the diagram.



$$\begin{aligned} 80^\circ + 5x &= 180^\circ \\ 80^\circ - 80^\circ + 5x &= 180^\circ - 80^\circ \\ 5x &= 100^\circ \\ x &= 20^\circ \end{aligned}$$

18. Simplify; $x^5 \times x^3 \div x^4$

$$\begin{aligned} x^5 \times x^3 \div x^4 &= x^4 \\ = x^{5+3} \div x^4 &= x^4 \\ = x^8 \div x^4 &= x^{8-4} \\ = x^4 & \end{aligned}$$

19. How many jumps of 4cm can a frog make to cover a distance of 2 metres?

$$\begin{aligned} \frac{2 \text{ m to cm}}{1 \text{ m} = 100 \text{ cm}} \\ 2 \text{ m} = 2 \times 100 \text{ cm} \\ = 200 \text{ cm} \end{aligned}$$

No. of jumps

$$\begin{aligned} &= \left(\frac{200 \text{ cm}}{4 \text{ cm}} \right) \text{jumps} \\ &= 50 \text{ jumps} \end{aligned}$$

20. Use power notation to expand 396.7.

$$= 3 \times 100 + 9 \times 10 + 6 \times 1 + 7 \times \frac{1}{10}$$

$$= \underline{3 \times 10^2 + 9 \times 10^1 + 6 \times 10^0 + 7 \times 10^{-1}}$$

TD



SECTION B: 60 MARKS

Attempt all questions in this section.

Marks for each part of the question are indicated in the brackets.

- 21.(a) Prime factorise 36 and 54 and represent the prime factors in a set notation.

36

$$\begin{array}{r} 36 \\ \downarrow 2 \\ 18 \\ \downarrow 2 \\ 9 \\ \downarrow 3 \\ 3 \\ \downarrow 3 \\ 1 \end{array}$$

$$\text{Set notation} = \{2_1, 2_2, 3_1, 3_2\}$$

54

$$\begin{array}{r} 54 \\ \downarrow 2 \\ 27 \\ \downarrow 3 \\ 9 \\ \downarrow 3 \\ 3 \\ \downarrow 3 \\ 1 \end{array}$$

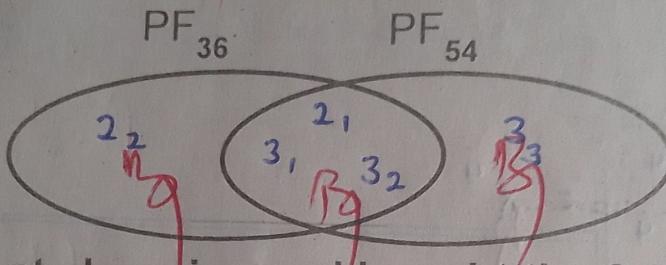
$$\text{Set notation} = \{2_1, 3_1, 3_2, 3_3\}$$

(02 marks)

- (b) Represent the prime factors on the venn diagram below. (03 marks)

$$36 = \{2_1, 2_2, 3_1, 3_2\}$$

$$54 = \{2_1, 3_1, 3_2, 3_3\}$$



22. A mother went shopping and bought the following items;

1 $\frac{1}{2}$ kg of meat at sh. 14,000 per kilogramme.

500ml of milk at sh. 2,000 every litre.

4 bars of soap at sh. 32,000

12 tomatoes at sh. 1,000 for every 3 tomatoes.

Meat

$$\begin{aligned} 1\text{kg} &= \text{sh. } 14000 \\ 1\frac{1}{2}\text{kg} &= \frac{3}{2} \times \text{sh. } 14000 \\ &= \text{sh. } 21000 \end{aligned}$$

Milk

$$\begin{aligned} 500\text{ml} &= \text{sh. } 2000 \\ 1000\text{ml} &= \text{sh. } 4000 \end{aligned}$$

$$= \text{sh. } 1000 \text{ ml}$$

$$\text{Soap} \rightarrow \text{sh. } 32000$$

Tomatoes

$$\frac{1}{3} \times 4 \times \text{sh. } 1000$$

$$= \text{sh. } 4000$$

T.T. expenditure

$$\begin{aligned} \text{sh. } 21000 \\ \text{sh. } 4000 \\ \text{sh. } 32000 \\ \text{sh. } 1000 \\ \text{sh. } 4000 \end{aligned}$$

Discount

$$\begin{aligned} \text{sh. } 58000 \\ - \text{sh. } 52200 \\ \text{sh. } 05800 \end{aligned}$$

%age discount

$$\begin{aligned} \text{Discount} \times 100\% \\ \text{T-T bill} \end{aligned}$$

$$\begin{aligned} (\text{sh. } 5800 \times 100\%) \\ \text{sh. } 5800 \end{aligned}$$

$$= 1 \times 100\%$$

$$= 100\%$$

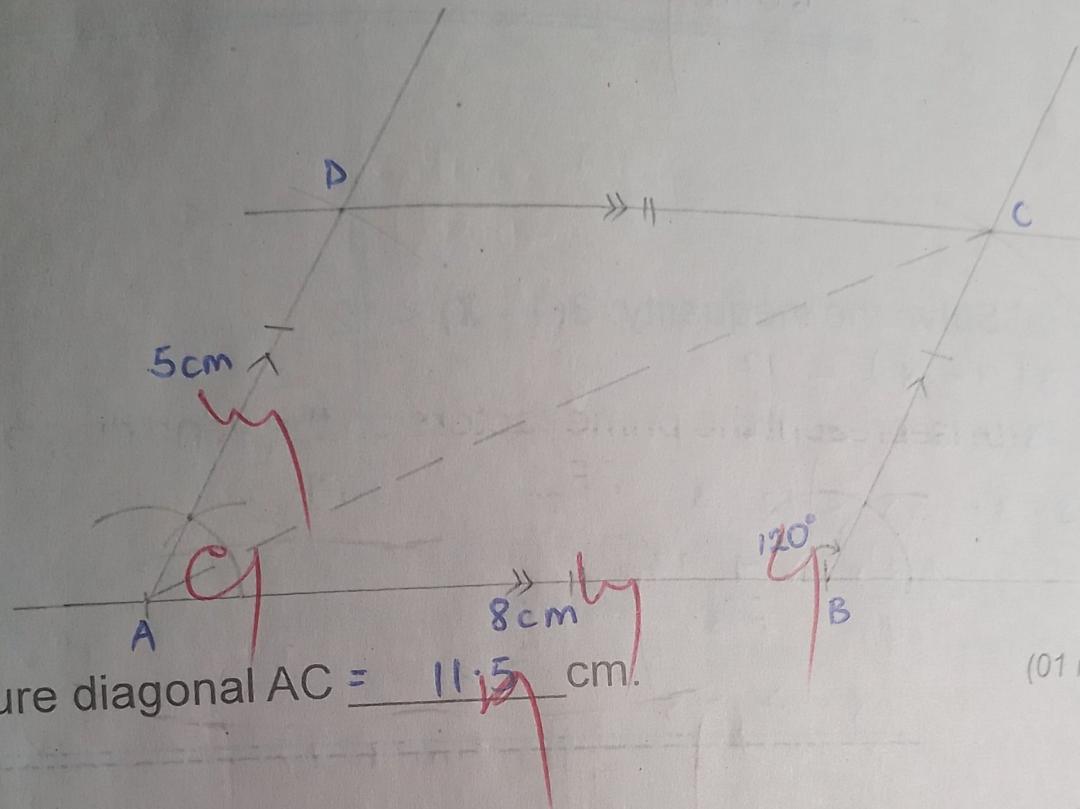
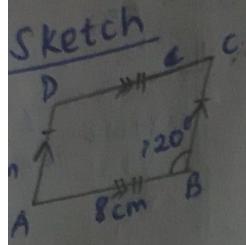
(05 marks)



23. (a) With the help of a ruler, a pencil and a pair of compasses only, construct a parallelogram ABCD such that angle ABC is 120° , line AB is 8cm, and line AD is 5cm.

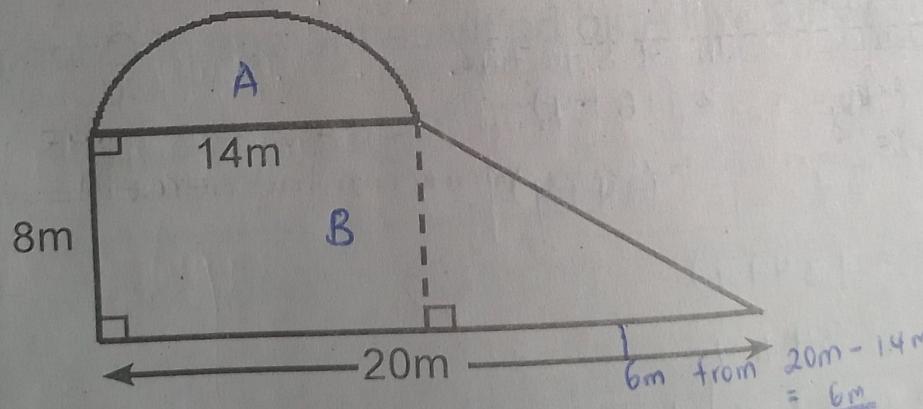
Accurate diagram

(04 marks)



(01 mark)

24. Study and use the figure below to answer the questions that follow.



(03 m)

(a) Find the area of the figure above.

Area of A

$$\begin{aligned} & \frac{1}{2} \pi r^2 \\ & = \frac{1}{2} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \text{ cm} \\ & = 11 \times 7 \text{ m}^2 \\ & = 77 \text{ m}^2 \end{aligned}$$

Area of B

$$\begin{aligned} & = \frac{1}{2} h(a+b) \\ & = \frac{1}{2} \times 8 \text{ m} (14 \text{ m} + 20 \text{ m}) \\ & = 4 \text{ m} \times 34 \text{ m} \\ & = 136 \text{ m}^2 \end{aligned}$$

T.T. area

$$\begin{aligned} & 136 \text{ m}^2 \\ & + 77 \text{ m}^2 \\ & 213 \text{ m}^2 \end{aligned}$$

(b) Work out the distance round the figure above. (0)

$$\begin{aligned} \text{Dist. around} &= \frac{1}{2}\pi D + L + L + W \\ &= \frac{1}{2} \times \frac{22}{7} \times 14\text{m} + 10\text{m} + 20\text{m} + 8\text{m} \\ &= 22\text{m} + 30\text{m} + 8\text{m} \\ &= \underline{\underline{60\text{m}}} \end{aligned}$$

25. (a) Solve the inequality: $3(1 - x) < 12$ (03)

$$\begin{aligned} 3(1 - x) &< 12 \\ 3 - 3x &< 12 \\ 3 - 3 - 3x &< 12 - 3 \\ +3x &> 9 + 3 \\ 3x &> 12 \\ x &> 4 \end{aligned}$$

(b) Odongo is 16 years old while Apio is 34 years old. After how many years, will Apio be twice the age of Odongo? (02)

Names	Now	In y yrs time
Odongo	16	$2(16+y)$
Apio	34	$(34+y)$

$$\begin{aligned} 2(16+y) &= (34+y) \\ 32+2y &= 34+y \\ 32-32+2y &= 34-32+y \\ 2y &= 2+y \end{aligned}$$

$$2y - y = 2 + y - y$$

$$y = 2 \text{ yrs}$$

∴ After 2 yrs

08

26. Suubi deposited money in the bank which offers a simple interest of 10% per year. After a period of 2 years, his account had an amount of sh. 864,000. Find the amount Suubi deposited in the bank.

$$\begin{array}{r}
 864 \\
 \times 5 \\
 \hline
 4320
 \end{array}$$

$$\therefore P = \text{sh. } 720,000$$

(04 marks)

$$P + SI = \text{Amount}$$

$$P + (P \times T \times R) = \text{sh. } 864,000$$

$$P + (P \times 2 \times 10) = \text{sh. } 864,000$$

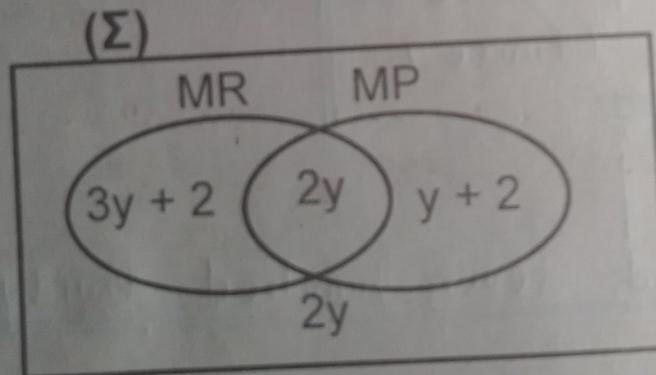
Let P

$$\frac{P \times 5}{5} + \frac{P \times 10}{5} = \text{sh. } 864,000 \times 5$$

$$5P + P = \text{sh. } 432,000$$

$$\frac{16P}{4} = \text{sh. } \frac{432,000}{4}$$

27. The Venn diagram below shows pupils who eat two kinds of food, Matoke and Rice (MR), Matoke and Posho (MP), three kinds of food and Matoke only. Study and use it to answer the questions that follow.



- (a) If 32 pupils eat two kinds of food only, find the number of pupils

who ate the three kinds of food.

Value of y

$$3y + 2 + y + 2 = 32$$

$$3y + y + 2 + 2 = 32$$

$$4y + 4 = 32$$

$$4y + 4 - 4 = 32 - 4$$

$$\frac{14y}{4} = \frac{28}{4}$$

$$= y = 7$$

No. of pupils who ate three kinds of food.

$$= 2y$$

$$= 2 \times 7 \text{ pupils}$$

$$= 14 \text{ pupils}$$

(03 marks)

61

(b) Work out the number of pupils in the class.

$$3y+2 + 2y + y+2 + 2y$$

$$3 \times 7 + 2 + 2 \times 7 + 2 + 2 \times 7$$

$$= 21 + 2 + 14 + 9 + 14$$

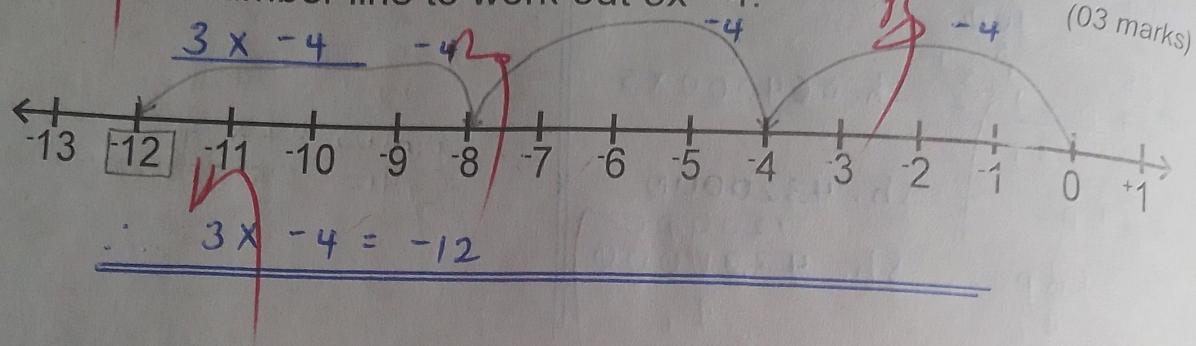
$$= 23 + 23 + 14$$

$$= \underline{\underline{60 \text{ pupils}}}$$

(02 marks)

$$\begin{array}{r} 1 \\ + 23 \\ + 23 \\ \hline 14 \\ \hline 60 \end{array}$$

28. (a) Use the number line to work out $3x - 4$.



(b) If today is Friday, which day of the week was it 25 days ago?

Present - $\frac{25}{7} = 3 \text{ rem } 6$ day (finite) | It was Saturday (02 marks)

$$\begin{aligned} 5 &- 6 = \text{day} \quad (\text{finite } 7) \\ (5+7) &- 6 = \text{day} \quad (\text{finite } 7) \\ 12 &- 6 = \underline{\underline{6}} \quad (\text{finite } 7) \end{aligned}$$

29. (a) Write 69,732 in words.

Millions	Thousands	Units
000	069	732

(02 marks)

Sixty-nine thousand, seven hundred thirty-two

(b) Calculate the quotient of the value of 9 and of the value of 3 in the above number.

Value of 9	Quotient
732	$\frac{300}{9000}$
9	300
9×1000	3×10
9000	= 30

(03 marks)

12

30. The frequency table below shows marks scored and the number of pupils who wrote the examination. Study and use it to answer the questions that follow.

Marks scored	55	60	70	93
Number of pupils	4	3	2	2

(a) Find the number of pupils who sat the examination. (01 mark)

$$\begin{aligned} &= 4 + 3 + 2 + 2 \text{ pupils} \\ &= 7 + 4 \text{ pupils} \\ &= \underline{\underline{11 \text{ pupils}}} \end{aligned}$$

(b) How many pupils scored above the average mark? (03 marks)

Average mark

$$\begin{aligned} &(55 \times 4) + (60 \times 3) + (70 \times 2) + (93 \times 2) \\ &= \underline{\underline{220 + 180 + 140 + 186}} \\ &= \frac{66}{11} \\ &= \frac{726}{11}, \quad = \underline{\underline{66}} \end{aligned}$$

No. of pupils above average mark

$$\begin{aligned} &= 2 + 2 \\ &= 4 \text{ pupils} \end{aligned}$$

55	$\times 4 @$
220	
93	$+ 93$
186	
2	$\times 2$
220	$+ 180$
140	
186	$+ 140$
726	

(02 marks) 726

31. (a) Convert 10m/sec to km/h.

10 m to km
$\frac{10}{1000} \text{ km}$
sec to hrs
$\frac{1}{60 \times 60} \text{ hrs}$

$$\begin{aligned} D &= S \frac{(km)}{(hrs)} \\ &= \frac{10}{1000} \text{ km} \div \frac{1}{60 \times 60} \text{ hrs} \\ &= 1 \times \frac{60 \times 60}{1000} \text{ km/hr} \\ &= \frac{100}{6 \times 6} \text{ km/hr} \\ &= \underline{\underline{36 \text{ km/hr}}} \end{aligned}$$

(b) A bus left Kampala at 8:00 a.m. and arrived at Gulu at 9:45 a.m. If it was travelling at a speed of 80km/h, find the distance it covered. (03 marks)

Time
9:45 a.m
- 8:00 a.m

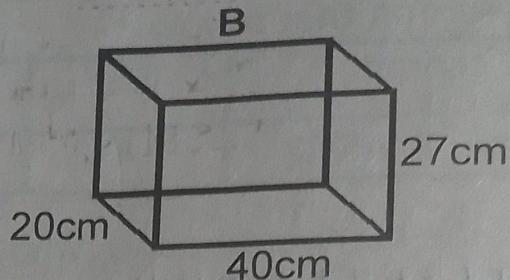
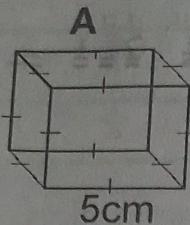
$$\begin{aligned} D &= S \times T \\ &= 80 \text{ km/hr} \times 1 \frac{3}{4} \text{ hrs} \\ &= \frac{20}{80} \text{ km} \times \frac{7}{4} \text{ hrs} \\ &= 20 \times 7 \text{ km} \\ &= \underline{\underline{140 \text{ km}}} \end{aligned}$$

09

3
60
4
= 3



32. The cubes of type A are packed into a box of type B. Study the figures and use them to answer the questions that follow.



(a) How many cubes are packed along the bottom layer? (02 marks)

Along length
 $= \left(\frac{40 \text{ cm}}{5 \text{ cm}}\right) \text{ cubes}$
 $= 8 \text{ cubes}$

T-T cubes
 $= 8 \times 4 \text{ cubes}$
 $= 32 \text{ cubes}$

Along width
 $= \left(\frac{20 \text{ cm}}{5 \text{ cm}}\right) \text{ cubes}$
 $= 4 \text{ cubes}$

(b) How many cubes of type A will be packed in a big box B?

Along height

$\frac{s}{5}$
 $= \left(\frac{27 \text{ cm}}{5 \text{ cm}}\right) \text{ cubes}$
 $= 5 \text{ cubes}$

All cubes
 $= 32 \times 5 \text{ cubes}$
 $= 160 \text{ cubes}$

(02 marks)

$$\begin{array}{r} 32 \\ \times 5 \\ \hline 160 \end{array} \quad \textcircled{1}$$

(c) Find the volume of the space left unoccupied after packing.

Volume of big box
 $L \times W \times H$
 $= 40 \text{ cm} \times 20 \text{ cm} \times 27 \text{ cm}$
 $= 800 \text{ cm}^2 \times 27 \text{ cm}$
 $= 21,600 \text{ cm}^3$

Volume of all cubes
 $L \times L \times L \times 160$
 $= 5 \text{ cm} \times 5 \text{ cm} \times 5 \text{ cm} \times 160$
 $= 25 \text{ cm}^2 \times 5 \text{ cm} \times 160$
 $= 125 \text{ cm}^3 \times 160$
 $= 20,000 \text{ cm}^3$

Space left (02 marks)

$$\begin{array}{r} 21,600 \text{ cm}^3 \\ - 20,000 \text{ cm}^3 \\ \hline 1600 \text{ cm}^3 \end{array}$$

$$\begin{array}{r} 27 \\ \times 8 \\ \hline 216 \end{array}$$

$$\begin{array}{r} 25 \\ \times 5 \\ \hline 125 \end{array}$$

$$\begin{array}{r} 125 \\ \times 16 \\ \hline 2000 \end{array}$$

$$\begin{array}{r} 125 \\ + 750 \\ \hline 875 \end{array}$$

$$\begin{array}{r} 125 \\ \times 125 \\ \hline 15625 \end{array}$$